

IDS Data Flow Coordination

Introduction

Two data centers currently support the archiving and access activities for the IDS:

- Crustal Dynamics Data Information System (CDDIS), NASA GSFC, Greenbelt, MD USA
- Institut Géographique National (IGN), Paris France

These institutions have archived DORIS data since the launch of TOPEX/Poseidon in 1992.

Flow of IDS Data and Products

The flow of data, products, and information within the IDS is analogous to what is utilized in the other IAG geodetic services (IGS, ILRS, IVS) and is shown in Figure 1. IDS data and products are transmitted from their source to the IDS data centers. DORIS data are downloaded from the satellite at the DORIS control and processing center, SSALTO (Segment Sol multi-missions d'ALTimétrie, d'Orbitographie et de localisation précise) in Toulouse, France. After validation, SSALTO transmits the data to the IDS data centers (at this time, CDDIS only). IDS analysis centers as well as other users retrieve these data files from the data centers and produce products, which in turn are transmitted to the IDS data centers.

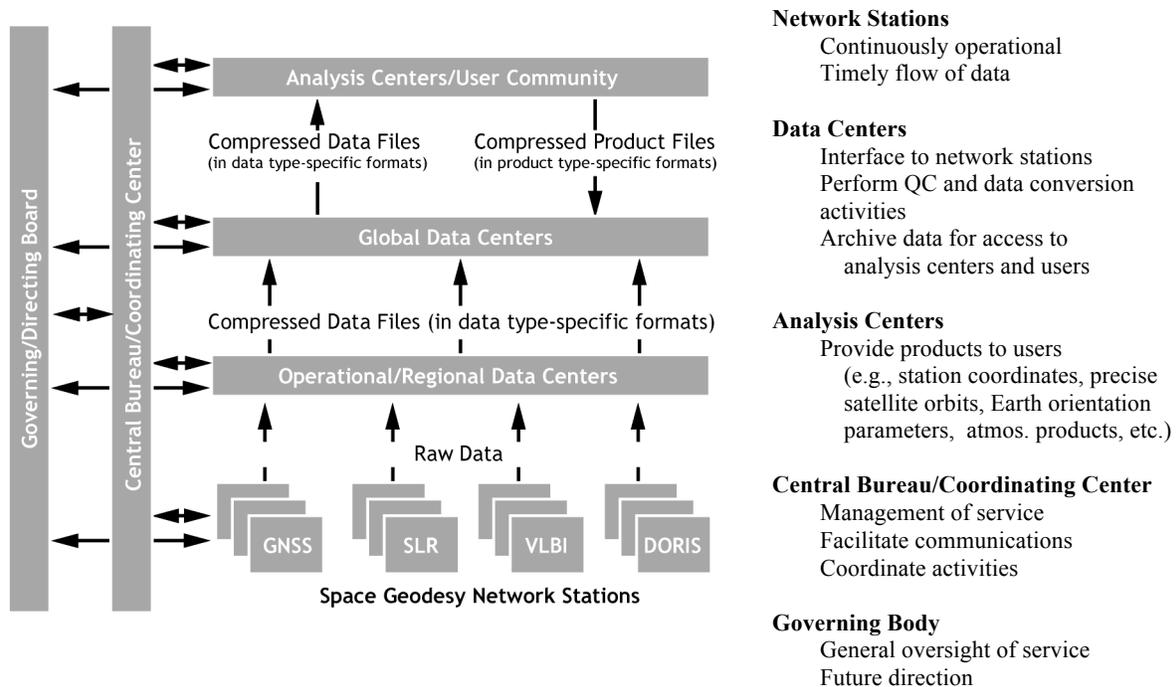


Figure 1. Routine flow of data and information for the IAG Geodetic Services

The IDS data centers use a common structure for directories and filenames that was implemented in January 2003. This structure is shown in Table 1 and fully described on the Analysis

Coordinator's website at http://lareg.ensg.ign.fr/IDS/doc/struct_dc.html. The main directories are:

- */pub/doris/data* (for all data) with subdirectories by satellite code
- */pub/doris/products* (for all products) with subdirectories by product type and analysis center
- */pub/doris/cb_mirror* with general information and data and product documentation (maintained by the IDS Central Bureau)

IGN currently mirrors the contents of the CDDIS data and product archives. Future plans call for SSALTO to possibly deliver data to both IDS data centers (CDDIS and IGN) to ensure redundancy in data delivery in the event one data center is unavailable. The general information available through the IDS Central Bureau ftp site are mirrored by the IDS data centers thus providing users secondary locations for these files.

Table 1. Main Directories for IDS Data and Products

Directory	File Name	Description
Data Directories		
/doris/data/sss	sssdataMMM.LLL.Z	DORIS data for satellite <i>sss</i> , cycle number <i>MMM</i> , and version <i>LLL</i>
	sss.files	File containing multi-day cycle filenames versus time span for satellite <i>sss</i>
/doris/data/sss/sum	sssdataMMM.LLL.sum.Z	Summary of contents of DORIS data file for satellite <i>sss</i> , cycle number <i>MMM</i> , and file version number <i>LLL</i>
Product Directories		
/doris/prodtype/cccl	orbits/cccl/cccssVV.bXXDDD.eYYYYE.sp1.LLL.Z	Satellite orbits in SP1 format from analysis center <i>ccc</i> , satellite <i>sss</i> , solution version <i>VV</i> , start date year <i>XX</i> and day <i>DDD</i> , end date year <i>YY</i> and day <i>EEE</i> , and file version number <i>LLL</i>
	sinex_global/ccclWWuVV.snz.Z	Global SINEX solutions of station coordinates for analysis center <i>ccc</i> , year <i>WW</i> , content <i>u</i> (d=DORIS, c=multi-technique), and solution version <i>VV</i>
	sinex_series/cccl/ccclYYDDDtVV.snz.Z	Time series SINEX solutions for analysis center <i>ccc</i> , starting on year <i>YY</i> and day of year <i>DDD</i> , type <i>t</i> (m=monthly, w=weekly, d=daily) solution, content <i>u</i> (d=DORIS, c=multi-technique), and solution version <i>VV</i>
	stcd/ccclWWtu/ccclWWtuVV.stcd.aaaa.Z	Station coordinate time series SINEX solutions for analysis center <i>ccc</i> , for year <i>WW</i> , type <i>t</i> (m=monthly, w=weekly, d=daily), content <i>u</i> (d=DORIS, c=multi-technique), solution version <i>VV</i> , for station <i>aaaa</i>
	geoc/ccclWWtuVV.geoc.Z	TRF origin (geocenter) solutions for analysis center <i>ccc</i> , for year <i>WW</i> , type <i>t</i> (m=monthly, w=weekly, d=daily), content <i>u</i> (d=DORIS, c=multi-technique), and solution version <i>VV</i>
	eop/ccclWWtuVV.eop.Z	Earth orientation parameter solutions for analysis center <i>ccc</i> , for year <i>WW</i> , type <i>t</i> (m=monthly, w=weekly, d=daily), content <i>u</i> (d=DORIS, c=multi-technique), and solution version <i>VV</i>
	iono/cccl/sss/cccssVV.YYDDD.iono.Z	Ionosphere products for analysis center <i>ccc</i> , satellite <i>sss</i> , solution version <i>VV</i> , and starting on year <i>YY</i> and day of year <i>DDD</i> .
Information Directories		
/doris/cb_mirror		Mirror of IDS central bureau files

DORIS Data

SSALTO deposits DORIS data to the CDDIS server cddis.gsfc.nasa.gov. Software at CDDIS peruses this incoming data area for new files and automatically archives the files to public disk

areas using the directory structure and filenames specified by the IDS. IGN mirrors the CDDIS DORIS data archive thus providing a second identical access point to the IDS community. The IDS data centers archive DORIS data from six operational satellites (TOPEX/Poseidon, SPOT-2, -4, -5, Jason-1, and Envisat); data from future missions (e.g., CryoSat) will be archived within the IDS. Historic data from SPOT-3 are also available at the data centers. A summary of DORIS data holdings at the IDS data centers is shown in Table 2. The DORIS data are archived in multi-day (typically 10-day) “cycle” files using the DORIS data format 2.1 (since January 15, 2002). The DORIS data files are on average two Mbytes in size (using UNIX compression). SSALTO issues an email notification through DORISReport once data are delivered to the IDS data centers. The average latency of data availability after the last observation day satellite specific:

- TOPEX: <20 days
- SPOT: ~30 days
- Jason-1: <30 days
- Envisat: ~50 days

The delay by file and satellite is shown in Figure 2.

Table 2. DORIS Data Holdings

Satellite	Time Span
TOPEX/Poseidon	25-Sep-1992 through present
SPOT-2	31-Mar through 04-Jul-1990
	04-Nov-1992 through present
SPOT-3	01-Feb-1994 through 09-Nov-1996
SPOT-4	01-May-1998 through present
SPOT-5	11-Jun-2002 through present
Jason-1	15-Jan-2002 through present
Envisat	13-Jun-2002 through present

DORIS Products

IDS analysis centers utilize similar procedures by putting products to the CDDIS server. Automated software detects any incoming product files and archives them to the appropriate product-specific directory. The following analysis centers (ACs) have submitted products to the IDS; their AC code is listed in ():

- Institut Géographique National/JPL (ign) France, P. Willis
- LEGOS/GRGS-CLS (lca) France, J.-F. Crétaux
- SSALTO (ssa) France, G. Tavernier
- CNES/SOD (sod) France, J.P. Berthias
- INASAN (ina) Russia, S. Tatevian

IDS products are archived by type of solution and analysis center. The types and sources of products available through the IDS data centers in 2003-2004 are shown in Table 3.

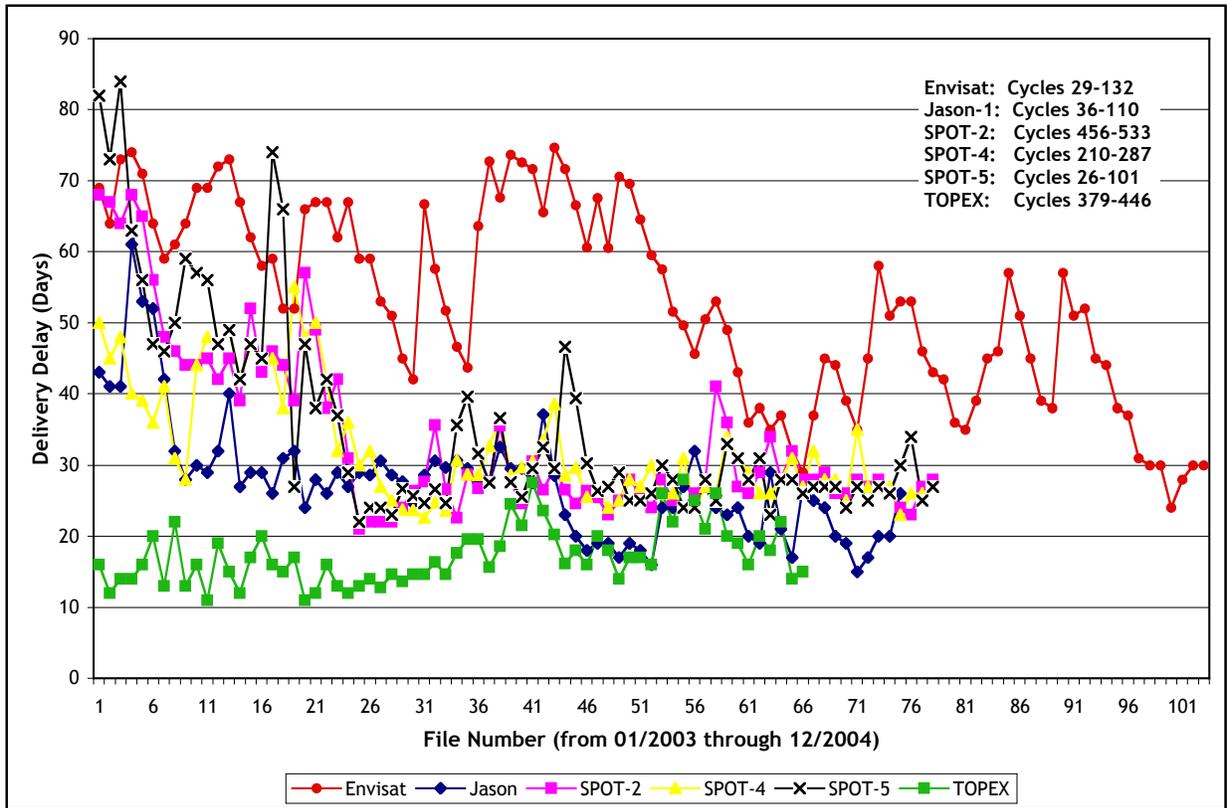


Figure 2. Delay in delivery of DORIS data to the CDDIS (all satellites, 01/2003-12/2004)

Table 4. IDS Product Types and Contributing Analysis Centers

Type of Product	IGN	LCA	SSA	SOD	INA
Time series of SINEX solutions	X (W, M)	X (M)	X (W,M)	X (W)	X (M)
Global SINEX solutions	X				
Time series of coordinates of the TRF origin	X				X
Orbits/satellite		X (Jason)			
Ionosphere products/satellite			X (All)		
Time series of EOP	X				
Time series of station coordinate	X (W)	X (M)	X (W)		

Notes: W=weekly solution
 M=monthly solution

Future Plans

The IDS will investigate the redundant transmission of data and products to both IDS data centers. This capability would ensure the availability of data and products should either data center be unavailable. The IDS data centers will also investigate procedures to regularly compare holdings of data and products to ensure that the archives are truly identical. Lastly, the data centers will investigate the utility of issuing regular reports of data holdings through the DORISReport email system.

IDS Data Centers

Crustal Dynamics Data Information System (CDDIS)

The CDDIS is a dedicated data center supporting the international space geodesy community since 1982. The CDDIS serves as one of the primary data centers for the following IAG services:

- International GPS Service (IGS)
- International Laser Ranging Service (ILRS)
- International VLBI Service for Geodesy and Astrometry (IVS)
- International DORIS Service (IDS)
- International Earth Rotation Service (IERS)

The CDDIS automated software archives data submitted by SSALTO and performs minimal quality-checks (e.g., file readability, format compliance) resulting in a summary file for each data file. Software extracts metadata from all incoming DORIS data. These metadata include satellite, time span, station, and number of observations per pass. The metadata are loaded into an Oracle data base and utilized to generate data holding reports on a daily basis.

During 2003, over 110 groups in 30 countries accessed DORIS data and information from the CDDIS.

Future Plans

The CDDIS plans to be operational on a new server by mid-January 2005. The structure of the DORIS data and product archive will remain unchanged on this new server, cddis.gsfc.nasa.gov; other data types (GPS, GLONASS, and SLR) will be modified to present a more logical view of the filenames and directory structure.

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Procedures have been established at IGN to routinely mirror the contents of the data and product archives at the CDDIS.

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